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Langley Research Center



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Eye-Controlled "Teletypewriter"

Experimentation with an oculometer at Langley Research Center has led to the development of a "teletypewriter" system remotely controlled by eye movement. The oculometer provides a dynamic measurement of a subject's look direction, and its outputs can be used to generate a visual display of his look pattern and/or to cause an equipment operation associated with his lookpoint at given times. In the case of the "teletypewriter," a sketch of a typewriter keyboard was mounted in front of the subject and the keyboard characters became target lookpoints. Thus by looking at a specific character or letter, the subject could cause the "teletypewriter" to type that letter on its page copy.

The oculometer is a device that operates at a distance from the eye and requires no head-mounted equipment. It will track the subject's eye throughout a 1-ft³ (0.003-m³) motion box with an accuracy of approximately 1°. The sensing unit contains a tungsten filament lamp which, after being filtered, provides infrared illumination of the eye. This unit also contains a silicon target vidicon which, when operating with a standard 525-line TV scan, transforms an enhanced picture of the eye into a video signal. A signal processor, consisting of a minicomputer with a special interface section, analyzes this video signal and determines what portion of the keyboard sketch the subject is observing.

The output signals of the processor can be used to bring about an equipment operation such as typing on the "teletypewriter." Several methods of implementing print commands can be used. One simple method is printing whatever character the subject is regarding at the end of a discrete time interval. To give the operator variable-speed typing control, a print switch could be

actuated as soon as he fixates on a letter. In the case of a handicapped person, a special-purpose switch could be used (e.g., a switch that is breath or toe operated).

The function of this system is simply to report where or at what a subject is looking. There are possible applications in which the measured eye-direction information could be used as a control input at the man/machine interface. Such applications potentially would benefit operator unloading, hands-free control, and speed of response.

Note:

Requests for further information may be directed to:
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Patent status:

Inquiries concerning rights for the commercial use of this invention should be addressed to:

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